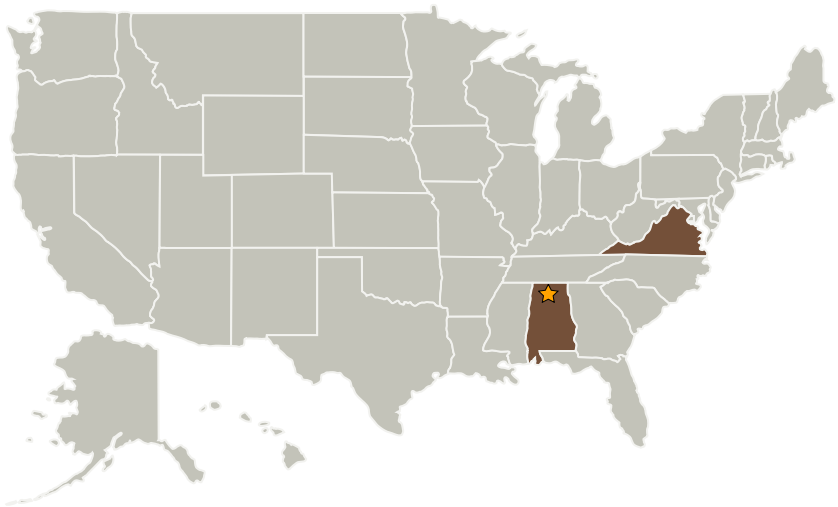
Advanced Fiber-Optic Instrumentation for Early Flight Fission Research, Phase II

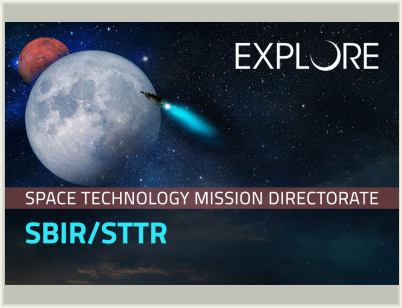
Completed Technology Project (2005 - 2016)

Project Introduction

By properly characterizing the thermo-mechanical activity within non-nuclear test articles, nuclear operation can be more accurately controlled and confidence in thermo-mechanical simulations will be high. However, the ability to characterize non-nuclear test core simulators is currently limited by the lack of instrumentation options available for measurements of parameters of interest such as temperature, strain, and pressure. The key to obtaining sufficient data lies in distributing large numbers of sensors throughout the core to monitor these parameters in real-time. Unfortunately, this type of measurement is not currently feasible. RTDs and thermocouples provide only single point measurements and, because of logistical problems associated with limited physical accessibility, cannot be used in any significant numbers and therefore serve to limit knowledge of the dynamic and complex thermal system represented by the test core. In the pursuit of early flight fission, more detailed measurements are needed for modeling the behavior of the core during operation. To address this need, Luna Innovations proposes to develop fiber-optic instrumentation sensors capable of high temperature operation based on Luna's unique distributed sensing technology, which uses fiber Bragg gratings as the sensing transducers for temperature, strain, and pressure measurements.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Luna Innovations, Inc.	Supporting Organization	Industry	Roanoke, Virginia

Primary U.S. Work Locations	
Alabama	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.6 Instrumentation and Health Monitoring for EDL